Title	**Quantitative and Qualitative Feedback Analysis through Mathematical Tools and Techniques**
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SYNOPSIS

This thesis is submitted for Ph.D. degree entitled **"Quantitative and Qualitative Feedback Analysis through Mathematical Tools and Techniques".** It is an outcome of inter disciplinary study of relevant fields on mathematics, statistics, fuzzy logic, data mining, classification, principle component analysis and MATLAB.

World is growing its new perspectives with the help of Technology. Every field is going to become computerized such as education, agriculture, government sector and even business world. The processes of working become faster and smoother because of computerized technology and mathematical techniques. Now a day the recent working trend of organization is done by internet -Email and Mobile-SMS. Also with the help of technology and mathematical techniques, organization can do work not only the door to door but with man to man. In man to man communication it is uniformly important to take the feedback of each person regarding the particular phenomena for better management and future development. Particularly business and organization world has got remarkable development by using feedback. Feedback is basic source of educating human in the sense of removing barriers they face in propagating their activities towards the targets they are given in their working environment. That is why, without proper feedback, the individuals and the organizations are unable to develop the standards which could meet the streamlined objectives. Users' feedback analysis of teaching, production, selling, marketing, and advertising are making things appropriate that did not proper previously in organization. If feedback analysis is done with the help of computerized technology and mathematics techniques then the process becomes smaller, easier, accurate and automatic with updating.

Since 1960, traditional feedback analysis is done but the proper feedback analysis is done scientifically from 1990.There are many computation and mathematical techniques on feedback analysis were done like statistical analysis on student feedback [Laura Pagani and Chiara Seghieri 2002] , quantitative model [Hassan Ghasemzadeh , Vitali Loseu and Roozbeh Jafari 2009] ,data mining [P.Ramasubramanian, K.Iyakutti, P.Thangavelu and J.Joy Winston 2009],

meta analysis [Martin Lee 2011], LDA [Colton and Miller 2011] ,PCA [Tavoli, Mahmoudi 2012], Opinion Mining [Angulakshmi and Chezian 2014],web mining [Bankim Patel and Atul Patel] .These all system are work with only one type of feedback data. But when there are both quantitative and qualitative feedback data of user are collected then these types of systems are fail and time consuming. Most of organizations require better feedback analysis of quantitative and qualitative data that covers complete solution for organization improvement and success. So here researchers have introduced a proposed feedback analysis system for quantitative and qualitative data [PFASQQD] with mathematical tools and techniques. The Proposed feedback system can analysis qualitative data or qualitative data or both that will help the organization in planning, prediction and taking decision in future.

If feedback analysis is done with the help of computerized technology and mathematics then the process becomes smaller, easier, accurate and automatic with updating. This research works bridge the gap between users' abilities, skills and knowledge of work and organizational goals and objectives. It also necessitate that management should build their interest in continuously training their users according to requirement of working environment and positively perceiving and responding their feedback. If we combine Mathematics and Feedback data base scientifically then it can be concretized.

This research work focus on analysis of qualitative and quantitative feedback answers to evaluate user performance by using mathematical, statistical and technology based tools and techniques. For proper analysis of feedback, we have proposed the Feedback Analysis System for Quantitative and Qualitative data as follows. This proposed system carries flexibility in itself and allows many other areas to work in the direction of performance enhancement of users.

Proposed Feedback Analysis System for Quantitative and Qualitative Data [PFASQQD]

The proposed feedback analysis system is shown in figure.1 contains different levels as follows:

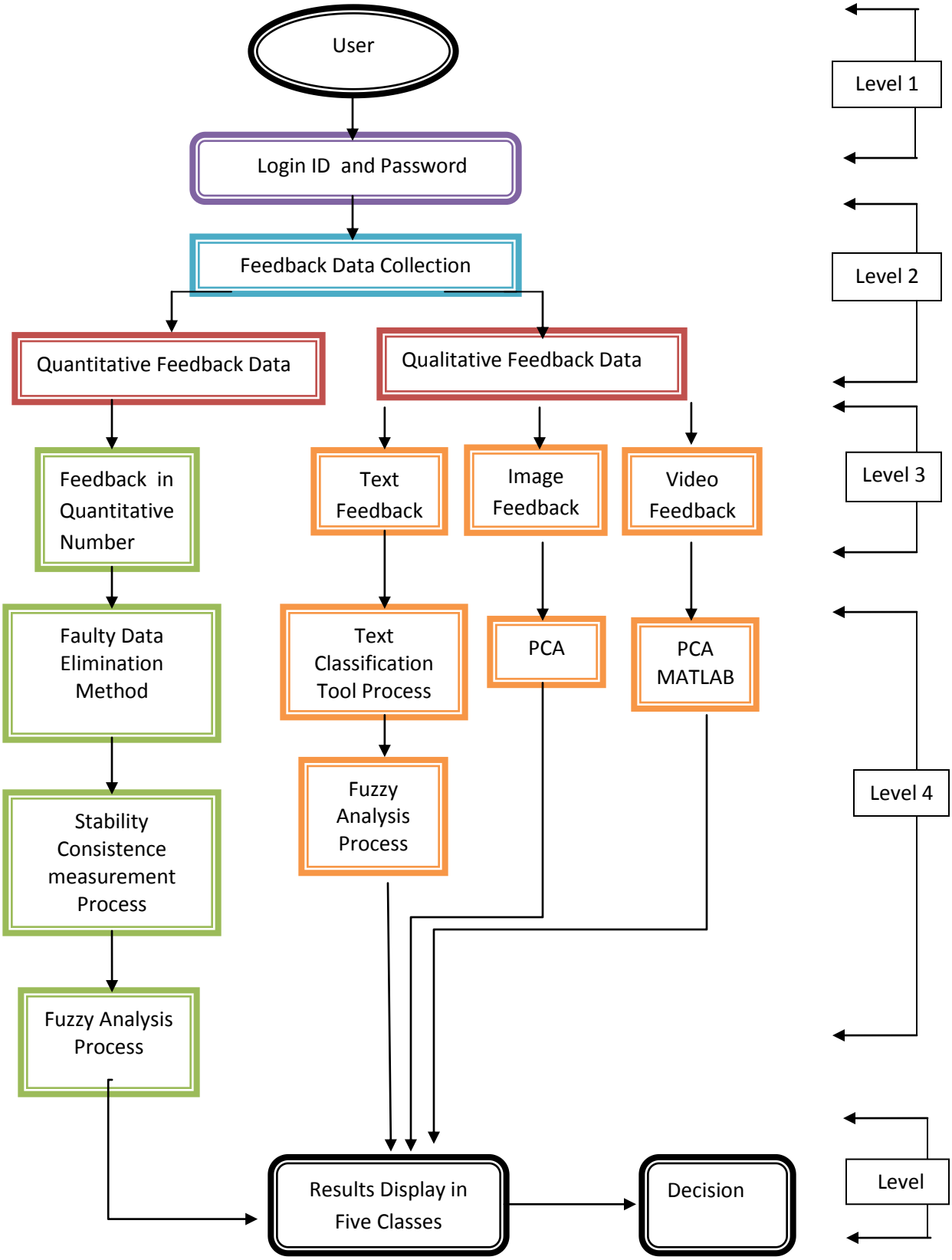

Figure 1: Proposed Feedback Analysis System for Quantitative and Qualitative Data

The complete PFASQQD works with five levels. At the initial **level 1,** the user enters in login system. There are three types of users. One is who gives feedback, second is who takes feedback, third is administrator. He/She uses the login ID module and gives the feedback. The administrator is a person who manages the whole PFASQQD like entering, editing, deleting etc. of data from database. User works as a guide in PFASQQD. He/She solves queries generated during authentication process in PFASQQD by user or system. At **level 2**,the process is to collect database. In this level user collects two types of feedbacks. It is the most important level of system because here the feedbacks are separates in quantitative and qualitative. The quantitative feedback is in numerical forms and the qualitative feedback in comments, images and video forms. PFASQQD verify user's quantitative and qualitative feedback data one by one. After that at the **level 3** system is manage feedback data. The system eliminates the faulty data and check stability consistency of quantitative feedback data. It also cleans the qualitative feedback for further analysis. At the **level 4** we have applied various mathematical tools and techniques like fuzzy modeling to analysis quantitative feedback and applied Text Classification, PCA, Rapid Miner and MATLAB for data analysis. At the **level 5**, the data analysis gives the evaluation in five different classes Very Good, Good ,Neutral ,Bad and Very Bad. In this level the result of analysis is discuss.

Objectives

We have decided the following objectives for study and research.

- To authenticate users using both qualitative and quantitative feedback data
- To develop a model to eliminate noisy and faulty feedback data
- To develop a model to check the stability consistency measurement of feedback data
- To develop quantitative feedback data based and qualitative feedback data bases feedback analysis system through mathematical techniques and tools
- To give an effective feedback analysis system for any type of feedback data

The thesis consists of seven chapters as given below:

Chapter 1

This first chapter gives an introduction of feedback, meaning of feedback, effectiveness of feedback and various types of feedbacks. It also discusses different types of feedback analysis methods with advantages and disadvantages, applications of feedback analysis. The literature reviews of previous feedback analysis methods are also described. Chapter also discusses Problem Statement of Proposed Feedback Analysis System for Quantitative and Qualitative data [PSASQQD].

Chapter 2

This chapter describes various fundamental definitions, facts, terms, algorithms and some principal part of mathematical tools and techniques. It gives description of mathematical techniques and tools like Data Mining, Text Mining, Image Mining, Principle Component Analysis, MATLAB and Rapid Miner. These all techniques and tools are mostly used for PFASQQD. The process and advantages of these techniques and tools are described shortly. It is also discusses the issues related to all these techniques and tools.

Chapter 3

This chapter introduces Proposed Feedback Analysis System for Quantitative and Qualitative Data [PFASQQD] which includes users and feedback database. It also discusses the mathematical techniques utilized in system (Data Mining limitations, Text mining, Image Mining, Video Mining, Principle Component Analysis, MATLAB and Rapid Miner).Chapter also includes the whole process of the system.

Chapter 4

This chapter explains the feedback analysis form which applying for collecting the database for quantitative feedbacks. It explains the faulty data elimination method with database of many users. This method erases the noisy and missing data from database .It gives accurate database. After that there is a discussion of stability consistency model which explains among of all feedback which is the best and accurate for PFASQQD.

Chapter 5

This chapter introduces the implantation of proposed system for quantitative data analysis after processing the faculty data elimination method and stability consistency model on qualitative data. It also includes the system discussion for qualitative data in text form. The analysis outputs are in five classes such as Very Good, Good, Neutral, Bad and Very Bad. It also gives each stage of algorithm, fuzzy analysis process and comparison with non fuzzy approach.

Chapter 6

This Chapter explains user qualitative feedback analysis from facial which categorize into five classes into five categories such as very good, good, neutral, bad and very bad. Chapter also includes the evaluation of these five classes by PFASQQD using PCA and MATLAB and explains each stage of algorithm and process by MATLAB outputs.

Chapter 7

This Chapter gives evaluations of many qualitative feedbacks from facial image into various action units given by Ekman such as very good, good, neutral, bad and very bad at one time. Chapter includes the evaluation of action units categorization by PFASQQD using PCA and MATLAB. It also discusses the algorithm and process by MATLAB outputs. It also discusses the combination for AU for summarize the output results.

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